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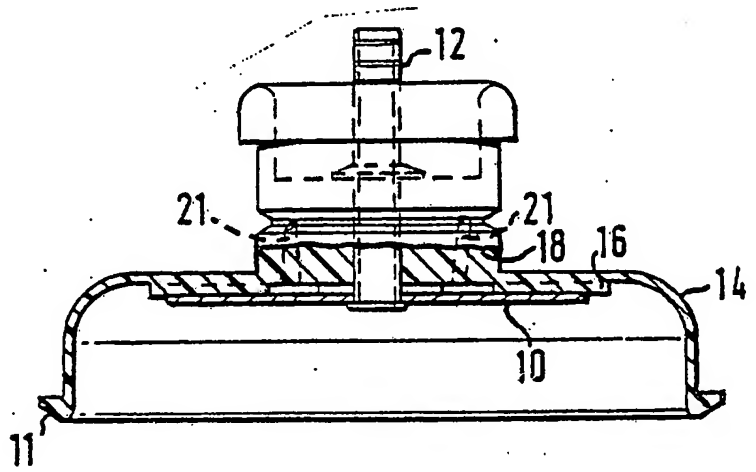
(54) Title: ELECTRODE UNIT FOR ELECTROTHERAPY



(57) Abstract

An electrode unit for use in electrotherapy comprises a cup (14) that is collapsed by suction applied to a pipe (12) that forms the stem of an electrode disc (10). Conduits (21) communicate the inside of the cup through a boss (18) with the atmosphere through a groove (15). A sleeve (19) extends from the boss and has circumferential rib or flange (20). It can be folded back to engage flange (20) into groove (15) to block off the conduits (21) and permit the cup to collapse when the rim of the cup is placed against the body of a patient and suction is applied and it can be lifted up to admit air into the conduits (21) and release the cup.

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ELECTRODE UNIT FOR ELECTROTHERAPY

The present invention relates to an electrode unit for use in electrotherapy, especially interferential therapy.

Interferential therapy (see for example U.K. Patent Specification No. 1337824) can be described as an electrical treatment that enables a low frequency current to be produced within the body by the application of two medium frequency currents to the skin by means of surface electrodes. Two separate circuits are used that set up an interference (or beat) frequency at a predetermined point of intersection. A low frequency current can stimulate the repair and healing of living tissue at a cellular level. A higher range of frequencies can induce pain relief. The electrodes through which the current is applied can be held to and in relation to the patient's body by means of suction cups fed with vacuum from a suction unit and it is an object of this invention to

provide an improved suction cup.

Broadly stated the invention provides an electrode unit for use in electrotherapy as aforesaid, characterised in that the cup is a one piece moulding provided with an integral vacuum control and release means.

In a preferred arrangement conduits lead from outside the cup through a boss to the inside and a sleeve extending from the boss can be folded back to overlie the conduits and prevent ingress of air when the cup is collapsed and can be lifted back from the boss to expose the conduits and admit air when the cup is to be released.

The invention also provides an electrode unit for use in electrotherapy comprising a cup formed in resilient material, an electrode in the cup, a boss on the outside of the cup, means for applying suction to the inside of the cup to collapse the cup and locate the electrode in relation to the patient's body, conduits leading from outside the cup through the boss to the inside and a sleeve extending from the boss that can be folded back to overlie the conduits and prevent ingress of air when the cup is to be collapsed and that can be lifted back from the boss to expose the conduits and admit air when the cup is to be released.

An embodiment of the electrode unit according to the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is an outside view of an electrode cup after moulding; and

Figure 2 is a partly sectioned side view of the electrode unit with the vacuum control sleeve partly folded back.

In the drawings an electrode disc 10 is provided with suction pipe 12 and fits into cup 14 formed as a one piece moulding in silicone rubber. Three equi-angularly

spaced lands 16 on the underside of the cup 14 maintain the electrode 10 spaced from the cup. The rim of the cup is stiffened by an out-turned flange 11 profiled to achieve an intended holding force on the patient's body. The exposed face of the cup has a central boss 18 through which the pipe 12 passes and extending from the boss 18 a sleeve 19 formed with an out-turned circumferential flange 20. The boss 18 is formed with a circumferential groove 15 and three equally spaced bores 21 communicate the groove 15 with regions of the lower face of the cup 14 overlying the disc 10 between the lands 16. The sleeve 19 can be folded back as shown in Figure 2 until the rib 20 enters the groove 15 and seals off the upper ends of the bores 21.

In use a suction line and electrical connection to one output of an interference current therapy apparatus are connected to pipe 12 and suction is applied to hold the cup onto a patient's body, the sleeve 19 being folded back to block off the holes 21. Accordingly the cup 14 deforms by partial vacuum within it to bring the disc 10 into contact with the patient's body via a moistened sponge under the disc. When the cup 14 is to be released, sleeve 19 is lifted up to expose the bores 21 and admit air into the space beneath the cup, the lands 16 serving to prevent the disc 10 from blocking off the ends of the passages 21. The sleeve 19 and flange 20 are an integral part of the cup moulding and therefore cannot be lost. The cups may be differently coloured e.g. yellow and blue to denote different electrical outputs from the therapy device.

CLAIMS:

1. An electrode unit for use in electrotherapy as aforesaid, characterised in that the cup (14) is a one piece moulding provided with an integral vacuum control and release means (19).

2. An electrode unit according to Claim 1, wherein conduits (21) lead from outside the cup (14) through a boss (18) to the inside to admit air into the cup (14) and a sleeve (19) extending from the boss (18) can be folded back to overlie the conduits (21) to prevent ingress of air when the cup is to be collapsed and can be lifted back from the boss (18) to expose the conduits (21) and admit air to release the cup.

3. An electrode unit according to Claim 2, wherein the boss (18) is formed with a circumferential groove (15) through which the conduits (21) open and the outer surface of the sleeve (19) is formed with a complementary circumferential flange (20) that locates into the groove (15) to isolate the conduits from the atmosphere.

4. An electrode unit for use in electrotherapy comprising a cup (14) formed in resilient material, an electrode (10) in the cup, a boss (18) on the outside of the cup, means (12) for applying suction to the inside of the cup to collapse the cup and locate the electrode in relation to the patient's body, conduits (21) leading from outside the cup through the boss to the inside to admit air into the cup and a sleeve (19) extending from the boss (18) that can be folded back to overlie the conduits (21) to prevent ingress of air when the cup (14) is to be collapsed and that can be lifted back from the boss (18) to expose the conduits (21) and admit air to release the cup (14).

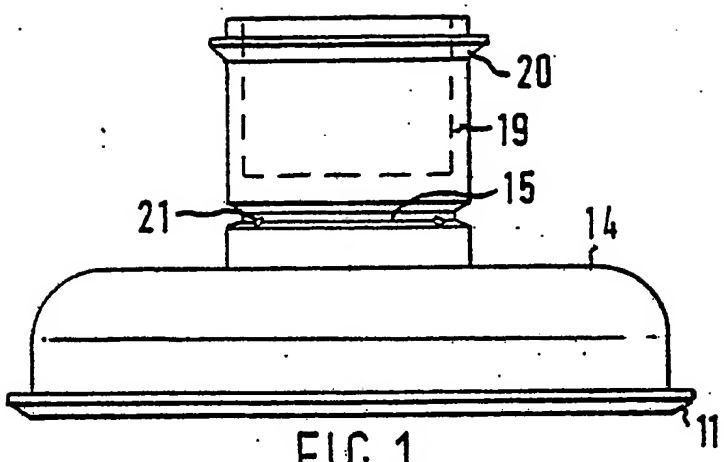

FIG. 1

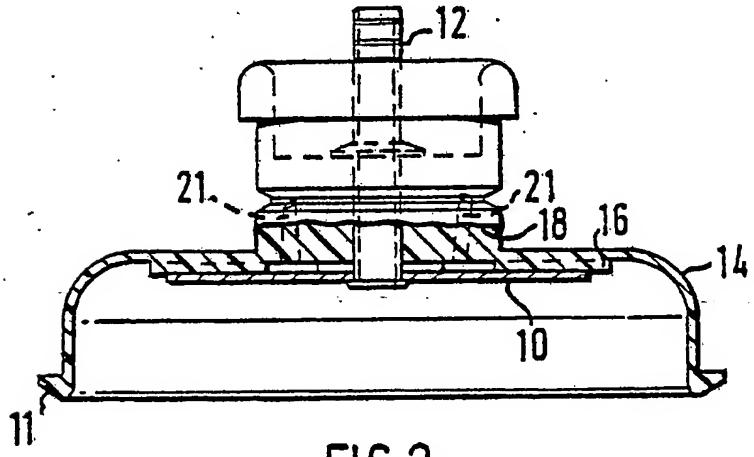

FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 84/00205

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [3]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC[3]: A 61 N 1/04

II. FIELDS SEARCHED

Minimum Documentation Searched [4]

Classification System	Classification Symbols
IPC[3]	A 61 N; A 61 B; F 16 B

Documentation Searched other than Minimum Documentation to the Extent that such Documents are included in the Fields Searched [5]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [14]

Category *	Citation of Document, [16] with indication, where appropriate, of the relevant passages [17]	Relevant to Claim No. [18]
Y	FR, A, 1139191 (SAMP) 26 June 1957 see page 1, right-hand column, lines 26-36	1
A		4
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Y	FR, A, 2343686 (FREUDENBERG) 10 July 1977 see page 3, lines 12-17	1
A		4
	--	
A	US, A, 4369793 (STAVER) 25 January 1983 see page 3, lines 34-46	1,4
	--	
A	GB, A, 392847 (KELLNER) 25 May 1933 see page 1, lines 84-93	1
	--	
A	US, A, 3534733 (PHIPPS) 20 October 1970	
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* Special categories of cited documents: [15]

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search [2]	Date of Mailing of this International Search Report [3]
20th September 1984	12 OCT. 1984
International Searching Authority [1]	**Signature of Authorized Officer [20]**
EUROPEAN PATENT OFFICE	G.L.M. Kreydenberg

Form PCT/ISA/210 (second sheet) (October 1981)

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON

INTERNATIONAL APPLICATION NO. PCT/GB 84/00205 (SA 7390)

This Annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on 04/10/84

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A- 1139191		None	
FR-A- 2343686	07/10/77	DE-A,B,C 2610664	15/09/77
		GB-A- 1534235	29/11/78
		JP-A- 52112054	20/09/77
		SE-A- 7702726	14/09/77
		SE-B- 434502	30/07/84
US-A- 4369793	25/01/83	None	
GB-A- 392847		None	
US-A- 3534733	20/10/70	None	